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Reconstruction of deep-sea temperatures across Early Eocene climate transition.

V. Lauretano (1), L.J. Lourens (1), J.C. Zachos (2), M. Polling (3), K. Littler (2), and A. Sluijs (3)

(1) Faculty of Geosciences, Earth Sciences, Utrecht University, Utrecht, The Netherlands, (2) Earth and Planetary Sciences Department, University of California, Santa Cruz. Santa Cruz, CA, USA, (3) Faculty of Geosciences, Laboratory of Palaeobotany and Palynology, Utrecht University, Utrecht, The Netherlands

The Late Paleocene- Early Eocene warming trend (55-50 Ma) is marked by a series of short-lived global warming events, known as hyperthermals. The Paleocene-Eocene Thermal Maximum, (PETM), is the most pronounced, followed by the ETM2 (Elmo) and the ETM3 ("X-event") up to the Early Eocene Climatic Optimum (EECO). These transient greenhouse episodes are characterized by an extreme increase in temperature associated with the release of large amounts of isotopically light carbon into the ocean-atmosphere system. The effects of these extreme greenhouse conditions coincide with negative carbon isotope excursions (CIE) recorded in the bulk carbonate δ13C record. Lourens et al, (2005) suggested that hyperthermal events coincide with eccentricity maxima, implying that they are astronomically paced. In this study, we reconstruct changes in deep ocean temperature and carbon cycle across the Early Eocene climate transition. The main tool for understanding these mechanisms is a high-resolution benthic stable isotope record from the deepest and shallowest sites of the Walvis Ridge ODP Leg 208 depth transect in the southeastern Atlantic Ocean.